

What Is Claimed Is:

1. A flame synthesized aluminum nitride filler-powder containing elements Al, O and N, or containing elements Al and N, characterized in that the particle size of the powder is included within the range of 0.001 to 500 μm , the mean particle size thereof is within the range of 0.1 to 100 μm , the external shape of the particles is spherical, and the powder is manufactured in a vapor phase in the presence of a flame.

2. The powder according to claim 1, wherein said powder is manufactured in the presence of a combustion flame of a single combustible gas consisting of elements C or H, a combustion flame of a mixed gas consisting of a combustible gas and oxygen, a reducing combustion flame in which the proportions of the combustible gas and oxygen are adjusted so that the amount of oxygen is less than the amount of oxygen in the perfect combustion ratio, a flame created by the plasma of an inert gas, or an arc flame generated between metals in a non-contact state to which a high voltage is applied.

3. The powder according to claim 1, wherein the raw material is a powder consisting of element Al whose particle size is included within the range of 0.01 to 500 μm , and a

nitridation reaction is proceeded by using a flame in the presence of nitrogen, ammonia or an inert gas.

4. The powder according to claim 1, wherein the raw material is a mixture of a powder consisting of elements Al and O and a powder consisting of element C whose respective particle sizes are included within the range of 0.001 to 500 μm , and a nitridation reaction is proceeded by using a flame in the presence of nitrogen, ammonia or an inert gas.

5. The powder prepared by the step of, subjecting the powder defined in any of claims 1 through 4 to a heat treatment either continuously or intermittently in the temperature range of 500 to 10,000°C in the presence of air, nitrogen, ammonia or an inert gas, or in a vacuum state, by using a flame or an apparatus that is capable of applying a high temperature to the powder.

6. A method for manufacturing the powder defined in any of claims 1 through 5, containing elements Al, O and N or containing elements Al and N, said comprising the steps of:

forming a raw-material powder whose particle size is included within the range of 0.001 to 500 μm , and whose mean particle size is within the range of 0.1 to 100 μm , into a highly dispersed and stable fluidized state or aerosol state;

09381765-104504

subjecting said raw-material powder to a nitridation reaction in which direct nitridation or reduction nitridation is performed in the presence of a flame, so that a nitride is synthesized; and if necessary heat-treating said nitride.

7. A raw-material powder (filler) consisting of the powder defined in any of claims 1 through 5 containing elements Al, O and N or a powder containing elements Al and N, characterized in that the powder is used as a raw-material powder (filler) in a composite material system in which a powder composed of inorganic materials is to be filled in a resin type raw material composed of organic materials.

8. An apparatus which is used to manufacture the powder defined in any of claims 1 through 5, comprising a flame generating device, a raw-material powder supply device and a device which supplies air, nitrogen, ammonia or an inert gas as the constituent elements of the apparatus, wherein a nitridation reaction of the raw-material powder is proceeded in a vapor phase in the presence of a flame.

9. The manufacturing apparatus according to claim 8, containing a flame generating device with a structure in which a plurality of cylindrical tubes having different internal diameters are combined in a coaxial configuration as a constituent element of the apparatus, wherein the raw-material

powder is supplied to any of the cylindrical tubes, a reaction gas is supplied to other cylindrical tubes, the raw-material powder and the reaction gas are diffused and mixed in the vicinity of the tip end portions of the cylindrical tubes containing the raw-material powder, and a nitridation reaction of the raw-material powder is proceeded in a vapor phase in the presence of a flame.